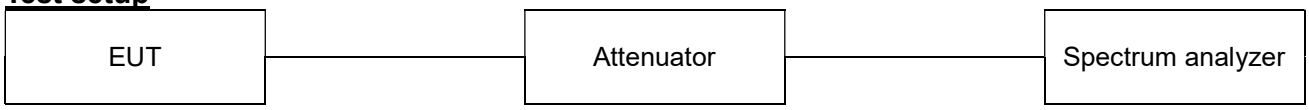
7.5. Conducted Spurious Emission

Test setup



Limit

According to §15.247(d), In any 100 ㎑ bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operation, the radio frequency power that is produced by the intentional radiator shall be at least 20 ㏈ below that in the 100 ㎑ bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted powr averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation specified in §15.209(a) is not required. In addition, radiated emission limits specified in §15.209(a) (see §15.205(c)).
Limit : 20 ㏈c

Test procedure

ANSI C63.10 - Section 11.11.3, 14.3.3
KDB 558074 D01 v05 - Section 8.5
KDB 662911 D01 v02r01 – section (E)(3)(b)

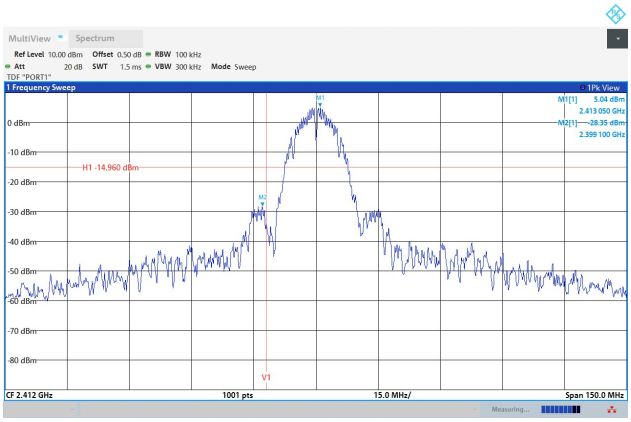
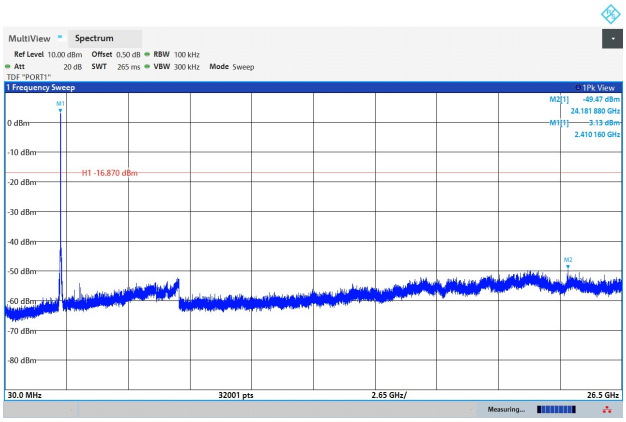
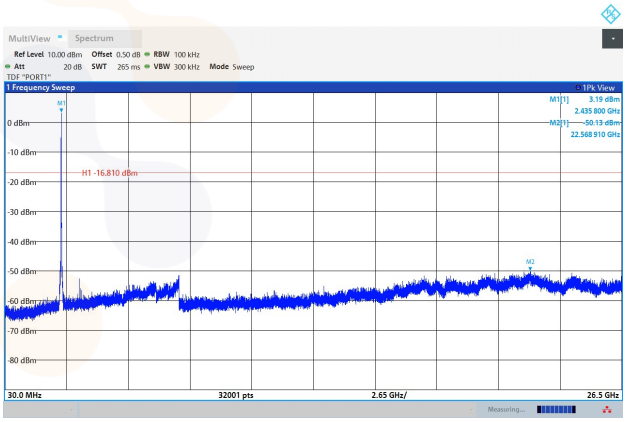
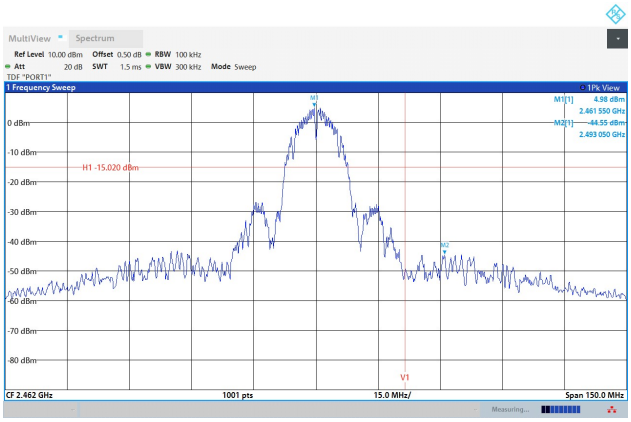
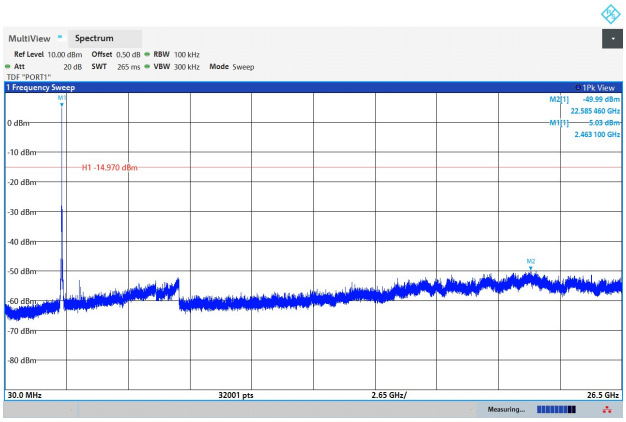
Test settings

Establish an emission level by using the following procedure:

1) Set the center frequency and span to encompass frequency range to be measured.
2) Set the RBW = 100 ㎑
3) Set the VBW ≥ [3 x RBW]
4) Detector = peak
5) Sweep time = auto couple
6) Trace mode = max hold
7) Allow trace to fully stabilize.
8) Use the peak marker function to determine the maximum amplitude level.

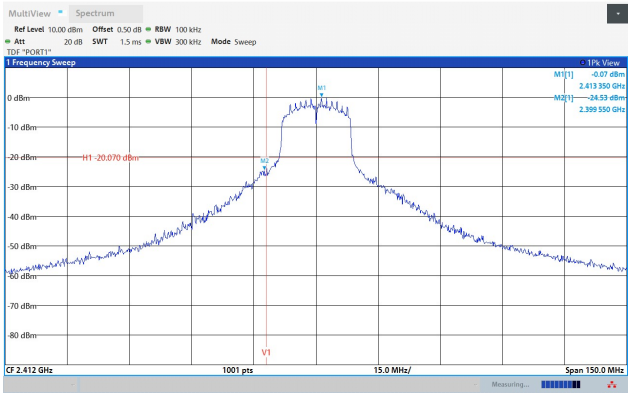
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Test results

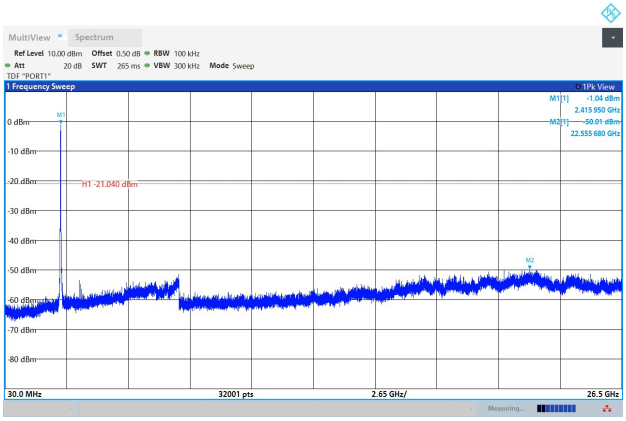
802.11b	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
Conducted band-edge / 2 462 ㎒	**Conducted spurious / 2 462 ㎒**
	

802.11g

Conducted band-edge / 2 412 ㎒



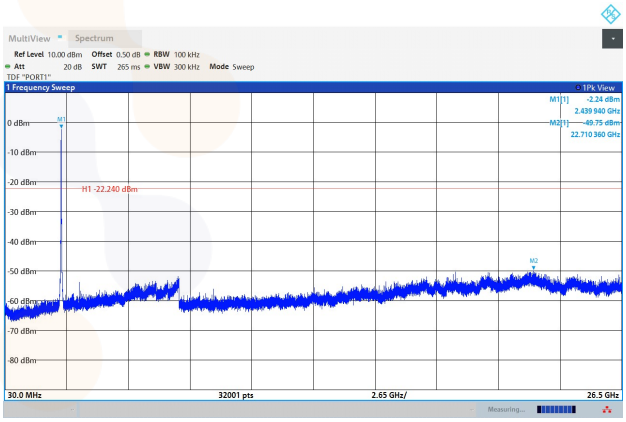
Conducted spurious / 2 412 ㎒



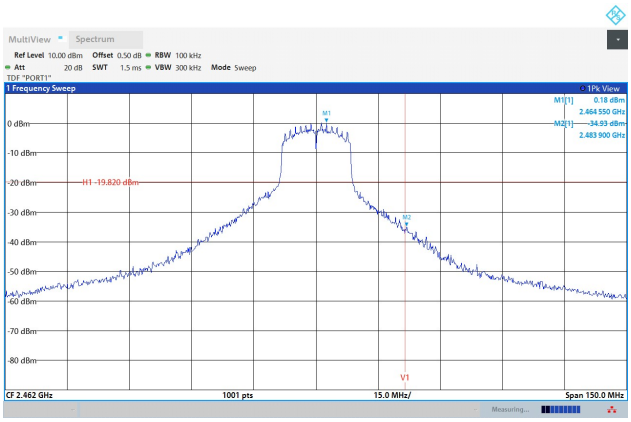
Conducted band-edge / 2 437 ㎒

Blank

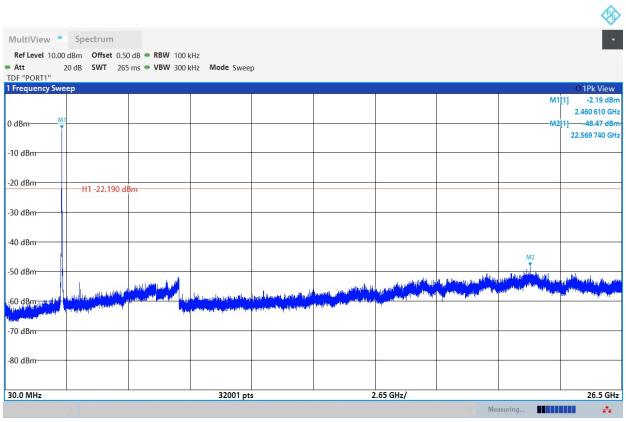
Conducted spurious / 2 437 ㎒



Conducted band-edge / 2 462 ㎒

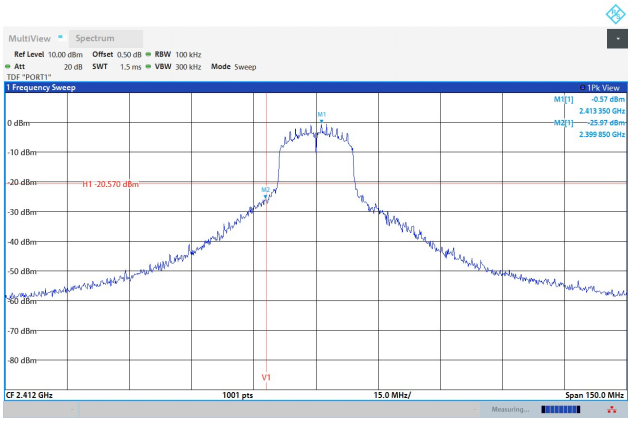


Conducted spurious / 2 462 ㎒

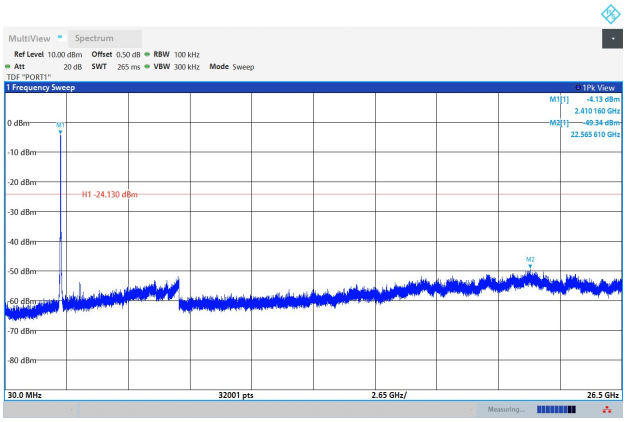


802.11n HT20

Conducted band-edge / 2 412 ㎒



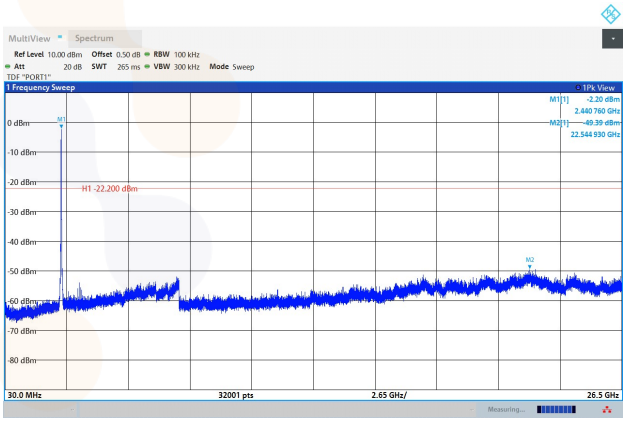
Conducted spurious / 2 412 ㎒



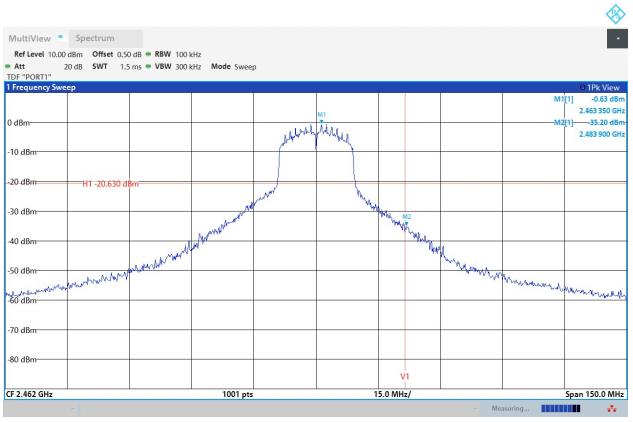
Conducted band-edge / 2 437 ㎒

Blank

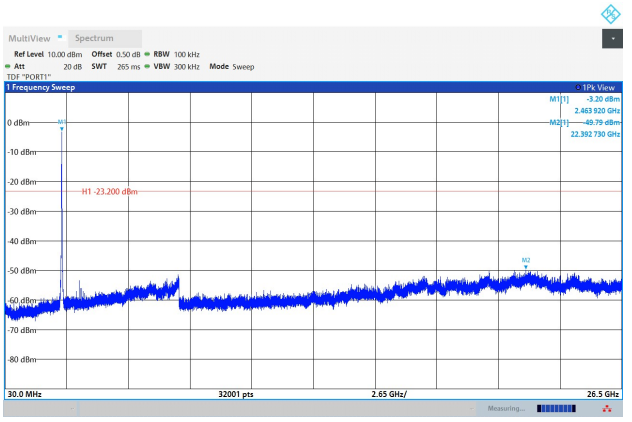
Conducted spurious / 2 437 ㎒



Conducted band-edge / 2 462 ㎒

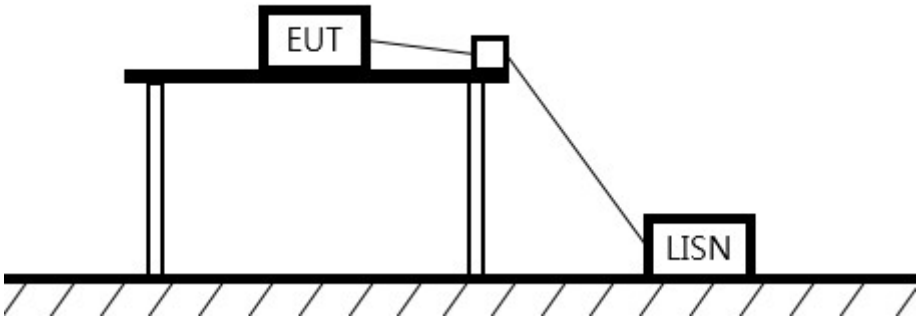


Conducted spurious / 2 462 ㎒



7.6. AC Conducted emission

Test setup



Limit

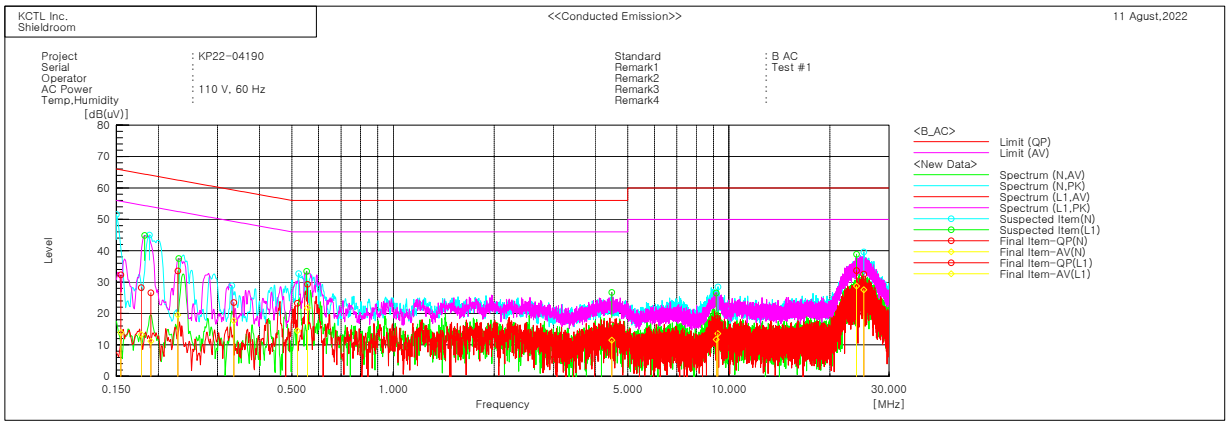
According to 15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (㎒)	Conducted limit (dB㎶/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 ㎝ in which is located 40 ㎝ away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a spectrum analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 ㎒ to 30 ㎒.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 ㎑ or to quasi-peak and average within a bandwidth of 9 ㎑. The EUT was in transmitting mode during the measurements.

Test results–Worst case: 802.11g mode / 2 437 ㎒



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.15465	22.6	4.2	9.7	32.3	13.9	65.7	55.7	33.4	41.8
2	0.18987	16.6	1.1	10.0	26.6	11.1	64.0	54.0	37.4	42.9
3	0.33572	13.8	8.0	9.7	23.5	17.7	59.3	49.3	35.8	31.6
4	0.51902	13.4	4.7	9.8	23.2	14.5	56.0	46.0	32.8	31.5
5	9.27735	8.6	3.8	9.8	18.4	13.6	60.0	50.0	41.6	36.4
6	25.22638	22.6	17.6	9.9	32.5	27.5	60.0	50.0	27.5	22.5

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.17784	18.3	3.3	10.0	28.3	13.3	64.6	54.6	36.3	41.3
2	0.22865	23.8	9.8	9.7	33.5	19.5	62.5	52.5	29.0	33.0
3	0.5565	19.5	12.0	9.8	29.3	21.8	56.0	46.0	26.7	24.2
4	4.48344	6.7	1.8	9.7	16.4	11.5	56.0	46.0	39.6	34.5
5	9.16785	6.8	1.9	9.8	16.6	11.7	60.0	50.0	43.4	38.3
6	24.00142	23.7	18.7	10.0	33.7	28.7	60.0	50.0	26.3	21.3

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV40	100989	23.10.14*
EMI TEST RECEIVER	R&S	ESCI7	100732	24.01.19
Bi-Log Antenna	TESEQ	CBL 6112D	55545	24.04.27
Amplifier	SONOMA INSTRUMENT	310N	284608	23.08.18*
ATTENUATOR	KEYSIGHT	8491B-6dB	MY39271060	24.04.27
ISOLATION TRANSFORMER	ONETECH CO., LTD	OT-IT500VA	OTR1-16026	23.03.28
Horn antenna	ETS.lindgren	3117	155787	23.09.29*
Horn antenna	ETS.lindgren	3116	86635	23.05.04
Attenuator	API Inmet	40AH2W-10	12	23.05.03
Broadband PreAmplifier	SCHWARZBECK	BBV9718	216	23.07.11
AMPLIFIER	LTC Microwave	LLA01185522Q-B	141	23.06.23
AMPLIFIER	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000997	23.07.12
LOOP Antenna	R&S	HFH2-Z2	100355	24.08.10*
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	CO3000	1175/45850319/P	-
Antenna Mast	Innco Systems	MA4000-EP	303	-
Turn Table	Innco Systems	CO3000	1175/45850319/P	-
High pass Filter	WT	WT-A1698-HS	WT160411001	23.05.03
TWO-LINE V - NETWORK	R&S	ENV216	101358	23.09.29*
EMI TEST RECEIVER	R&S	ESCI3	100001	23.08.18*
Vector Signal Generator	R&S	SMBV100A	257566	23.07.04
Signal Generator	R&S	SMB100A	176206	24.01.19
Signal & Spectrum Analyzer	R&S	FSV3030	1330.5000K30-101711-nf	23.10.14*
Attenuator	Weinschel ENGINEERING	56-10	51395	24.01.25

* Tests related to this equipment were progressed after the calibration was completed.

End of test report